

WHAT IS CLAIMED IS:

1. A thin film magnetic head comprising:
  - a lower core layer extending from a surface facing a  
5 recording medium in the height direction;
  - a magnetic layer connected directly or indirectly to the lower core layer at a predetermined distance from the surface facing the recording medium; and
  - a coil layer toroidally wound around the magnetic layer;
- 10 wherein a plurality of first coil pieces extending in a direction crossing the magnetic layer is disposed on the lower core layer with predetermined intervals in a height direction, the first coil pieces being covered with a coil insulating layer on which the magnetic layer is formed;
- 15 a plurality of second coil pieces crossing the magnetic layer is disposed on the magnetic layer with an insulating layer provided therebetween so that the ends of each second coil piece, the ends of each first coil piece in the thickness direction;
- 20 the insulating layer comprises a first insulating sub-layer of an inorganic insulating material formed on the top of the magnetic layer, and second insulating sub-layers of an organic insulating material formed on both sides of the first insulating sub-layer in the track width direction within a  
25 region extending in the height direction and including the formation region of the second coil pieces; and
- the second insulating sub-layers extend beyond both end surfaces of the magnetic layer in the track width direction

so as to be interposed between the second coil pieces and both ends surfaces of the magnetic layer.

2. The thin film magnetic head according to claim 1,  
5 wherein the second insulating sub-layers are formed on both sides of the first insulating sub-layer to have a space larger than at least a track width  $T_w$  in the track width direction.

10 3. The thin film magnetic head according to claim 1, wherein the magnetic layer has a front end portion in which the width dimension at the surface facing the recording medium corresponds to the track width, and the width dimension is constant or gradually increases in the height  
15 direction, and a rear end portion in which the width between both base ends of the front end portion in the track width direction increases in the height direction, and the second insulating sub-layers and second coil pieces are provided on the rear end portion.

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4. The thin film magnetic head according to claim 1, wherein a pole tip layer comprising at least a lower pole sub-layer, a gap sub-layer made of a nonmagnetic metal material, and an upper pole sub-layer, which are formed by  
25 plating in turn from below, is formed on the lower core layer so that the track width  $T_w$  is defined by the width dimension of the pole tip layer in the track width direction at the surface facing the recording medium, and the magnetic layer

is laminated on the pole tip layer.

5. The thin film magnetic head according to claim 4,  
wherein the magnetic layer has a lower saturation magnetic  
5 flux density than that of the upper pole sub-layer.

6. The thin film magnetic head according to claim 1,  
wherein the average thickness of the first insulating layer is  
smaller than that of the second insulating sub-layers formed  
10 on both sides of the first insulating sub-layer.

7. The thin film magnetic head according to claim 1,  
wherein the distance between the adjacent ends of at least  
one pair of adjacent first coil pieces in the height  
15 direction is larger than the minimum distance between the  
first coil pieces in a region where the first coil pieces  
overlap with the magnetic layer.

8. The thin film magnetic head according to claim 7,  
20 wherein the plurality of the first coil pieces has parallel  
portions in the region where the first coil pieces overlap  
with the magnetic layer.

9. The thin film magnetic head according to claim 1,  
25 wherein the distance between the adjacent ends of at least  
one pair of adjacent second coil pieces in the height  
direction is larger than the minimum distance between the  
second coil pieces in a region where the second coil pieces

overlap with the magnetic layer.

10. The thin film magnetic head according to claim 9,  
wherein the plurality of the second coil pieces has parallel  
5 portions in the region where the second coil pieces overlap  
with the magnetic layer.

11. The thin film magnetic head according to claim 1,  
wherein the length dimension of each second coil piece in a  
10 first direction perpendicular to the current flow direction  
is larger than the length dimension of each first coil piece  
in the first direction.

12. The thin film magnetic head according to claim 1,  
15 wherein the thickness of each second coil piece is larger  
than the thickness of each first coil piece.